REFERENCE 34

Preliminary Review of New Brunswick's Mineral Industry – 1987

New Brunswick Department of Natural Resources and Energy
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Hon. Morris Green, Minister

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PRELIMINARY REVIEW OF
NEW BRUNSWICK'S MINERAL INDUSTRY
1987

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DEPARTMENT OF NATURAL RESOURCES AND ENERGY
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EXPLORATION

In 1987, gold was the main stimulant to mineral exploration in New Brunswick, as it has been for the past several years.

Gold was discovered in New Brunswick more than one hundred years ago, but the spectacular success of base metal exploration and mining had drawn much of the attention away from gold exploration until recently. It is important to note that one of the largest potential gold reserves in the Atlantic Provinces is contained within massive sulphide deposits in the Bathurst-Newcastle area (Miramichi Zone, Figure 1).

Because of gold exploration in the Province in the 1980s, at least two regions with high potential for gold deposits have been outlined: a) along the Bay of Fundy coast, and b) in the Alcida-Upsalquitch region (Figure 1).

The important gold-bearing terranes outlined to date are associated with large regional thrust-wrench fault systems near the boundaries of major tectonostratigraphic zones.

Southern New Brunswick Intense exploration has revealed several significant gold deposits along the Bay of Fundy coast. An extensive drilling program east of the Gordex Minerals Limited gold mine has outlined large gold-bearing quartz-carbonate zones that will increase the potential ore reserves.

Mispec Resources Inc., Glenvet Resources Ltd., Brunex Gold Resources Ltd., Cuvier Mines Inc., Lacana Mining Corporation, Mactaquac Mining Ltd., Brunswick Mining and Smelting Corporation Limited, and several prospectors explored gold occurrences in the Caledonia Zone. One prospector, Robert Baxter, staked an interesting platinum occurrence in an ultramafic pluton near Mechanic Settlement (Figure 1).

Although most of the interest was in the Caledonia Zone, several interesting gold discoveries were made in the eastern part of the Magaguadavic Zone (Figure 1). These include the Annidale silver-gold prospect (LAC Minerals Limited), the Evandale copper-gold prospect (Costigan Gold Corporation), and the Shear mine gold prospect (Stratabound Minerals Corp.). Brunswick Mining and Smelting Corporation Limited and Goldfluor Explorations Ltd. explored interesting prospects northeast of South Oromocto Lake (Figure 1). The intriguing gold discoveries made by Goldfluor Explorations Ltd. and the results of a Dept. of Natural Resources and Energy, Minerals and Energy Division till survey have significantly raised the gold potential of this terrane.

The most important mineral deposit found in this zone so far, the Mount Pleasant tungsten-tin deposit (Figure 1), is currently being investigated by LAC Minerals Limited. The company completed its exploration program at the Mount Pleasant site late in 1987. By the end of the year, the feasibility study on developing a tin zone about 1 km north of the tungsten deposit was completed and the report was under review by company officials. A decision concerning

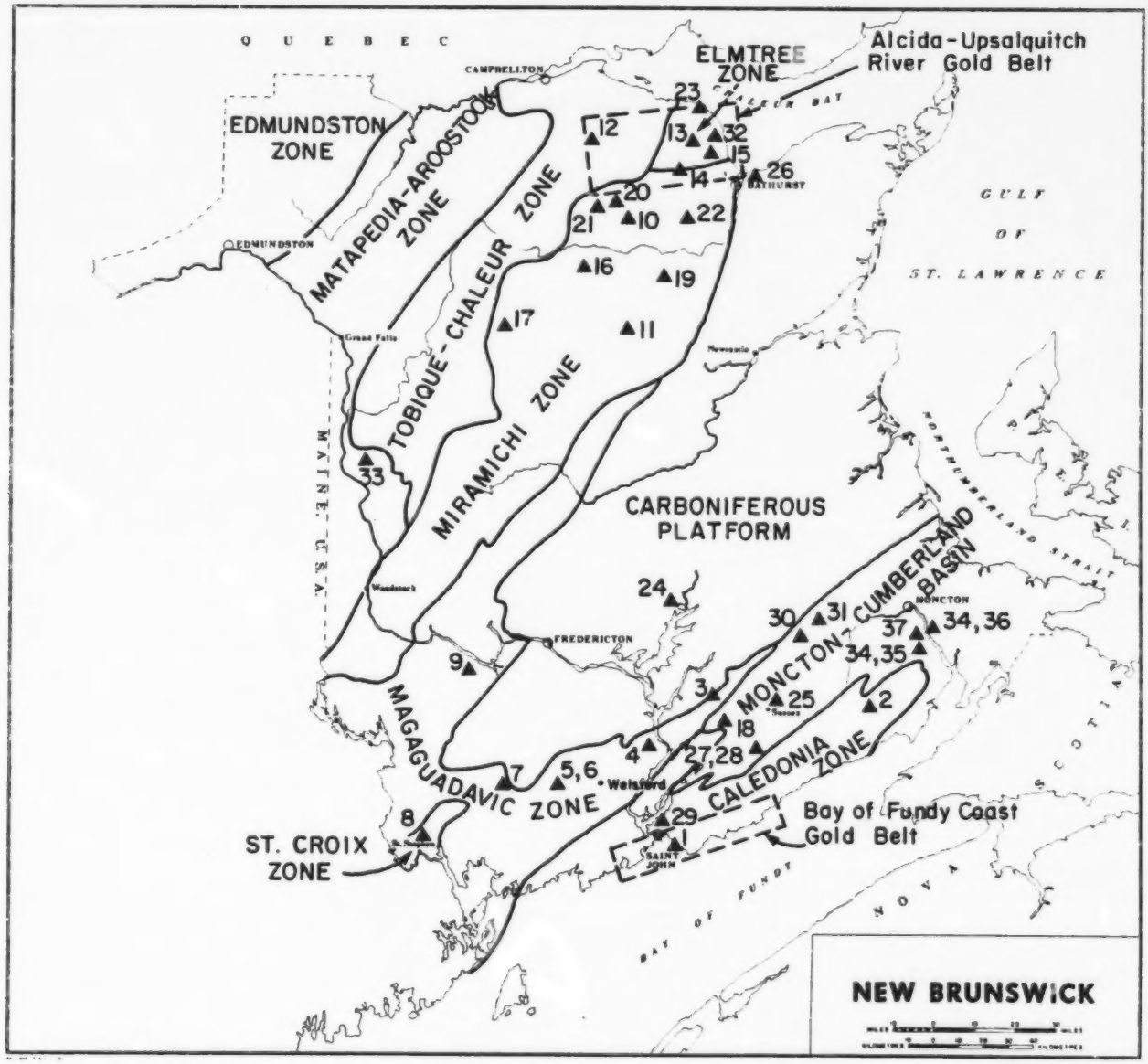

Figure 1. Tectonostratigraphic zones of New Brunswick and the location of properties explored in 1987. (Legend on next page)

Companies and Individuals Exploring or Mining in 1987 (to accompany Figure 1):

1. Gordex Minerals Limited, Cape Spencer mine (gold)
2. Robert Baxter, Mechanic Settlement (platinum)
3. LAC Minerals Limited, Annidale (silver, gold)
4. Costigan Gold Corporation, Evandale (copper, gold)
5. Stratabound Minerals Corp., Shear mine property (gold)
6. Goldfluor Exploration Ltd., South Oromocto Lake (gold)
7. LAC Minerals Limited, Mount Pleasant (tungsten, tin)
8. Gordex Minerals Limited, St. Stephen (nickel, copper)
9. Dominion Explorers Inc., Lake George mine (antimony, gold)
10. Lacana Mining Corporation, California Lake (silver)
11. Acadia Mineral Ventures Limited, Sevogle River (antimony, gold)
12. Lacana Mining Corporation, Rocky Brook (gold)
13. Lacana Mining Corporation, Alcida (gold)
14. Lacana Mining Corporation, Quebec Sturgeon River (base metal, silver)
15. Shamrock Resources Inc., Nigadoo (base metal, silver)
16. Granges Exploration, Maliseet (Goodwin Lake) (nickel, copper)
17. Inco Gold Company, Serpentine Lake (gold)
18. BP Resources Canada Ltd. (Selco Division), Millstream (potash)
19. Heath Steele Mines Limited, Heath Steele mine (zinc, lead, silver, copper)
20. East West Minerals Inc., Caribou (zinc, lead, silver, copper)
21. Northumberland Mines Ltd., Murray Brook (gold, silver)
22. Brunswick Mining and Smelting Corporation Limited, Brunswick No. 12 mine (zinc, lead)
23. Brunswick Mining and Smelting Corporation Limited, Belledune smelter and fertilizer plant
24. N.B. Coal Limited, Minto-Chipman area (coal)
25. Potash Company of America Inc., Sussex area mine (potash, salt)
26. Chaleur Silica Ltd., Bass River (silica)
27. Denison-Potacan Potash Company, Clover Hill mine (potash)
28. Sussex Silica Inc., Cassidy Lake (silica)
29. Brookville Manufacturing Company Ltd., Brookville (limestone)
30. Havelock Lime, Havelock quarry and plant (limestone)
31. Canada Cement Lafarge Ltd., Havelock area quarry (limestone)
32. Elmtree Resources Ltd., Elmtree quarry and plant (limestone)
33. Upper Kent Lime Works Ltd., Maplehurst (marl)
34. Western Decalta Petroleum (1977) Ltd., Stoney Creek area leases (oil and natural gas)
35. Canadian Occidental Petroleum Ltd., Albert Mines (oil shale)
36. Cartago Resources Ltd., Wetmorland County licence to search (oil shale)
37. Irving-Chevron, Stoney Creek field (oil, natural gas)

development of this zone is expected early in 1988. The reserves are estimated to be 5 900 000 tons (5 352 000 tonnes) of ore grading 0.79% tin. Further exploration is planned for the Mount Pleasant area in 1988.

The discovery of gold in the lower levels of the Lake George antimony mine (Figure 1) has also increased interest in the Magaguadavic Zone. Drilling by **Dominion Explorers Inc.** late in 1987 was partly funded by the Mineral Investment Stimulation Program (MISP) of the Canada-New Brunswick Mineral Development Agreement (1984-89).

Gordex Minerals Limited is assessing the platinum content of the St. Stephen nickel-copper deposit (Figure 1).

Western Decalta Petroleum (1977) Ltd. converted their 29 oil and natural gas licences to search in the Moncton Subbasin to three leases totalling 11 135 hectares. The retained leases are adjacent to the producing Stoney Creek field (Figure 1).

Canadian Occidental Petroleum Ltd., in cooperation with the **New Brunswick Electric Power Commission**, transported 10 000 tonnes of oil shale from the Albert Mines property (Figure 1) to Chatham for circulating fluidized bed combustion trials with coal. The trials are intended to demonstrate whether oil shale is a feasible sorbent to reduce sulphur emissions from coal. Talks between Occidental and N.B. Power continued during 1987 with respect to adding an oil shale retort to the thermal combustor at Chatham.

Cartago Resources Ltd. acquired an oil shale licence to search in Westmorland County (Figure 1) in 1985. Following the drilling of a high-grade shale zone in 1986, Cartago continued limited field exploration and trenching of the zone in 1987.

On February 1, 1981, **BP Resources Canada Ltd. (Selco Division)** was awarded the potash exploration rights for an area of 10 125 ha (25,000 acres) at Millstream, Kings County (Figure 1). A one-year extension to the agreement was granted on January 31, 1984 so that the exploration program could be completed. Eleven exploration holes and a pilot hole for a shaft have been completed on this property.

In July 1985, BP signed a mining lease with the Province. The company has submitted a preliminary development plan that includes completion of an exploration shaft and an underground exploration program prior to making a production decision. If this program is successful, a mine with a 900 000 product tonne capacity could open in the mid-1990s. To date, no decision has been made to sink the exploration shaft. The company is actively seeking a partner with marketing experience. A decision to proceed may be forth-coming in 1988.

Northern New Brunswick Gold exploration was most intense in the Silurian-Devonian volcanic and sedimentary terranes (Tobique-Chaleur Zone), but activity has recently expanded into adjacent regions. The realization that Devonian and Silurian epithermal systems are present in fractured Tetagouche Group rocks has led to increased activity in the Miramichi Zone, long known for its large base metal deposits.

Gold exploration in the Miramichi Zone has been successful. **Lacana Mining Corporation** has discovered an interesting silver-bearing fracture system northwest of California Lake, and **Acadia Mineral Ventures Limited** has found an interesting antimony-gold occur-

rence in the Sevogle River area.

Interest is also spreading to the Matapedia-Aroostook Zone in the northwestern part of the Province. This terrane is underlain by a thick sequence of turbidites of the Matapedia and Grog Brook groups.

In 1987, exploration continued at a high level in the 80 km Alcida-Upsalquitch River belt. Several gold occurrences have been found in this terrane, which straddles regional thrust-wrench fault systems. In the western part of the belt, **Lacana Mining Corporation** and **Noranda Exploration Company, Limited** have discovered several new occurrences associated with carbonate-quartz alteration in mafic plutons.

Lacana Mining Corporation has discovered a new gold occurrence near Rocky Brook in the central part of the belt (Figure 1). The results of a drilling program in late 1987 have not been reported. The most significant discovery to date is the Lacana Alcida deposit (30% owned by Acadia Mineral Ventures Ltd.) at the northeastern end of the belt, 21 km northwest of Bathurst (Figure 1). Several drill holes put down since 1986 have outlined approximately 300,000 tons (272 000 tonnes) of ore grading 0.15 oz./ton (5.14 g/t) gold. The most recent drilling program was partly supported by a MISP grant.

Lacana Mining Corporation also investigated the gold potential of several other promising areas, including the old Quebec Sturgeon River base metal-silver vein deposit (Figure 1) that was discovered in the 1880s and developed in the 1950s. This deposit is one of several discovered along the Rocky Brook-Millstream Fault within the last one hundred years. Drilling related to this project was also supported by a MISP grant.

Acadia Mineral Ventures Limited spent more than $1 000 000 in northern New Brunswick in 1987. In association with Seabright Exploration Inc., Seabright Resources Inc., Lacana Mining Corporation, and Cuvier Mines Inc., the company explored several properties in the Alcida-Upsalquitch belt and Miramichi Zone to the south (Northern Miner, Sept. 14, 1987). Several targets were located, including some along the Rocky Brook-Millstream Fault. These targets were all drilled in late 1987, but no results have been reported so far.

Noranda Exploration Company, Limited and **Brunswick Mining and Smelting Corporation Limited** continued to assess several prospects in many areas, but report no new discoveries. Noranda Exploration negotiated a joint venture with **Lucero Resource Corp.** to investigate several gold occurrences in the Upsalquitch area, but to date no results have been announced.

In other developments, **Shamrock Resources Inc.** obtained the Nigadoo base metal mine (Figure 1). The northerly extension of the veins was investigated for gold potential. **Granges Exploration** carried out a drilling program on the Maliseet (Goodwin Lake) nickel-copper deposit (Figure 1), mainly to determine its platinum potential. **Inco Gold Company** outlined an interesting gold prospect in granitic and metamorphic terrane of the Serpentine Lake area by analyzing tills and heavy mineral samples from streams.

Several other companies and individual explored parts of New Brunswick in 1987: J.D. Irving Limited, Heron Mines Ltd., Sharpe Energy and Resources, Lone Pine Exploration Ltd., Falconbridge Limited, Tintina Mines Limited, Shediac Bay Resources Inc., Mascarene Mines Ltd., Sullivan Resources Inc., Kinbauri Gold Corp.,

Rex Silver Mines Ltd., Highbourne Explorations Ltd., Appalachian Resources Inc., U.S. Borax Inc., and Stratabound Minerals Corporation.

In 1987, **Heath Steele Mines Limited** continued to search for improved sources of ore-grade material near the mine site, 51 km northwest of Newcastle (Figure 1). Surface drilling has delineated what appears to be a promising area, the Stratmat Boundary Zone, located approximately 6 km northwest of the Heath Steele mill. The drilling results were adequate to warrant Brunswick Mining and Smelting Corporation Limited and Noranda Exploration Company Limited to embark on a $5 000 000 underground exploration program (Miramichi Leader, Sept. 23, 1987). An exploration decline to be driven 8000 feet at a 13% slope will provide access to three main zones of interest. Upon completion, 2000 tonne bulk samples will be removed for metallurgical testing (Miramichi Leader, Aug. 26, 1987). This exploration phase is expected to take about 14 months to complete and will employ 20 people in addition to the regular workforce of 26 employees at the Heath Steele site.

The feasibility of reopening the mine will depend on finding ore of suitable grade and quantity that could be blended with known reserves of ore on the site. The operation would produce ore at a rate of 1800 tonnes/day and employ approximately 200 people (Telegraph-Journal, Jan. 11, 1988). A pit would probably be developed first, followed by underground stoping. A decision could be possible by the end of 1988 or beginning of 1989.

Heath Steele Mines Limited is spending in excess of $3 000 000 in exploration work on deposits near the mine.

Results of a geological structure study of the Heath Steele area deposits are expected to be released in 1989. Funding for this study ($292 000) was provided under the Canada-New Brunswick Mineral Development Agreement (1984-1989).

The company continued to maintain the Heath Steele property with respect to the mill and environmental standards.

Mineral Lands The total number of claims staked in 1987 was 4494, up 62% from the 1986 total of 2772 (Figure 2). At the end of the year, there were 10 544 claims, 110 mining licences (4174 claim equivalents) and 4 mining leases (437 claim equivalents) in effect, which represent a total claim equivalent of 15 155 (up 7% from 1986). The value of exploration carried out in the Province, as indicated in assessment reports submitted in 1987, was approximately $6 500 000. It is believed that twice this amount was actually spent.

The new Mining Act has been in effect for 17 months and appears to be working well. Amendments to streamline procedures required under the Act have been proposed by industry and concerned individuals. These will be addressed in 1988.

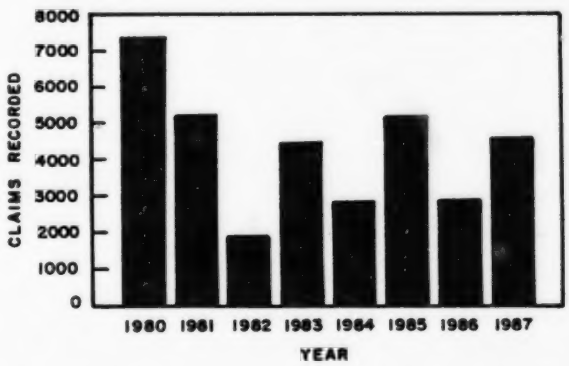

Figure 2. Mineral exploration claims recorded, 1980 to 1987.

DEPOSITS BEING DEVELOPED

In December 1986, **East West Minerals Inc.**, a wholly owned subsidiary of East West Minerals N.L. of Sydney, Australia, purchased Anaconda Canada Exploration Ltd. from Atlantic Richfield Co. The purchase included the rights to the Caribou Resources property, located 40 km west of Bathurst (Figure 1).

The newly established company, Caribou New Brunswick Mining Ltd., has taken a "fast track" approach to mine development and intends to be in production by mid-1988. In June 1987, application was made to the New Brunswick government for a mine lease; submissions are under review by various concerned departments. At a public meeting held in Bathurst on December 10, 1987, Caribou New Brunswick Mining Ltd., and the New Brunswick and Federal governments addressed the concerns of the general public.

During the year, the mill building was erected along with a mine dry facility and a water treatment plant. The site for the tailings pond was established and a "starter tailings dam" was constructed. Underground development consists of "definition drilling" of the orebody.

Caribou New Brunswick Mining Ltd. is expected to spend $40 000 000 on capital investment during the development and could employ approximately 185 people when operating. Ore from the underground cut-and-fill operation will be supplied to the on-site concentrator at a rate of 2000 tonnes/day (Northern Miner, Sept. 14, 1987). The bulk lead-zinc concentrate produced in the mill will be marketed in Europe.

Northumberland Mines Ltd. has received approval of its reclamation plan and is in the process of acquiring the necessary approvals to proceed with development of the Murray Brook gold and silver mine, 50 km west of Bathurst (Figure 1). Financial arrangements were made during 1987 and company officials have indicated that work should commence on the property in the spring of 1988. The capital cost for development is about $5 400 000 (Northern Miner, Nov. 2, 1987).

The operation will be an open-pit mine supplying ore at a rate of 1000 tonnes/day. The ore will be treated using the cyanide vat leach process. A workforce of 25 to 30 employees is anticipated at the mine, which will have a life of about six years unless additional reserves are outlined.

OPERATING MINES, WELLS AND QUARRIES

Production Statistics The total value of minerals produced in the Province in 1987 ($700 709 000) increased approximately 40% over the final figure for the previous year ($501 570 000). This marked increase can be attributed to a number of factors. Metal prices in general were higher and the quantity of minerals produced was significantly higher.

Metals make up approximately 69% of the total value of minerals produced in New Brunswick. Zinc continued to be the most valuable metal produced, accounting for about 40% of the total value of mineral production. The price of zinc remained reasonably stable during 1987; it reached its highest value about mid-year. A 43% increase in production accounted for the majority of the 50% increase in value over the previous year.

The value of lead produced was $83 960 000. Lead was the second most valuable metal produced, accounting for about 12% of New

Brunswick's total value of minerals produced. A 20% increase in production combined with an 80% increase in lead prices from the 1986 average gave lead an overall 85% increase in value.

Silver, copper and antimony followed in value ($62 248 000, $18 673 000, and $10 797 000, respectively). Copper experienced a tremendous increase in price from about mid-year onward.

Gold prices and production gradually increased throughout the year. The value of gold produced was $8 417 0[illegible]

Bismuth a[illegible]mium followed in value of productio[illegible]1 874 000 and $346 000, respectively).

Nonmetals, which increased in value by about 20%, contributed $142 539 000 (20%) to the total value of mineral production in 1987. As in 1986, potash was the main nonmetal contributor. Increased production accounted for much of the increase in value of potash and peat produced.

Fuels contributed $32 827 000 (about 5%) to the total value of production for the Province. During 1987, the Stoney Creek field near Moncton produced 3112 barrels of oil and 1 000 000 m^3 of natural gas.

Structural materials contributed $44 212 000 (approximately 6%) to the value of production.

New Brunswick produced a total of 21 different metals, minerals and commodities (Figure 3, Table 1). On a per capita basis, production in the Province compared very well with that of the rest of Canada. When compared to other provinces, New Brunswick ranked first in the production of antimony and bismuth, second in peat and potash, and third in zinc, lead, silver and sulphur.

Metallic Minerals Brunswick Mining and Smelting Corporation Limited, owner of the largest known zinc deposit in Canada (Figure 1), enjoyed higher metal prices and, as a result, realized significant profits for the first time in many years. In addition to improved profit margins, a new three-year agreement was signed with the United Steelworkers Union. By the end of this agreement, the operation will have been 10 years without a strike. Because of strong economic conditions in the industry, the only shutdowns were for regularly scheduled maintenance. In 1987, the workforce was reduced from 1500 to 1460 persons as part of a three-year attrition policy that began in 1985.

The Mining Division continued to deepen the No. 3 shaft.

Lead concentrate from Brunswick Mining and Smelting Corporation Limited, Mining Division, was smelted at the company's smelter in Belledune, 30 km northwest of Bathurst (Figure 1). A total of 79 433 000 kg of lead and 208 000 kg of silver were produced at the smelter in 1987 in addition to a number of lead and bismuth-antimony alloys. Sulphuric acid produced for the company's adjoining Belledune fertilizer plant amounted to 91 000 t. The acid is used to produce diammonium phosphate (fertilizer).

Durham Resources Inc. was sold to Dominion Explorers Inc. in 1987. At a special meeting on April 3, shareholders approved the purchase of large blocks of privately controlled Oakwood Petroleums Ltd. shares, Aur Resources Inc. shares, and private financing by issuance of Landmark Corporation treasury shares. This acquisition of shares gave Landmark Corporation

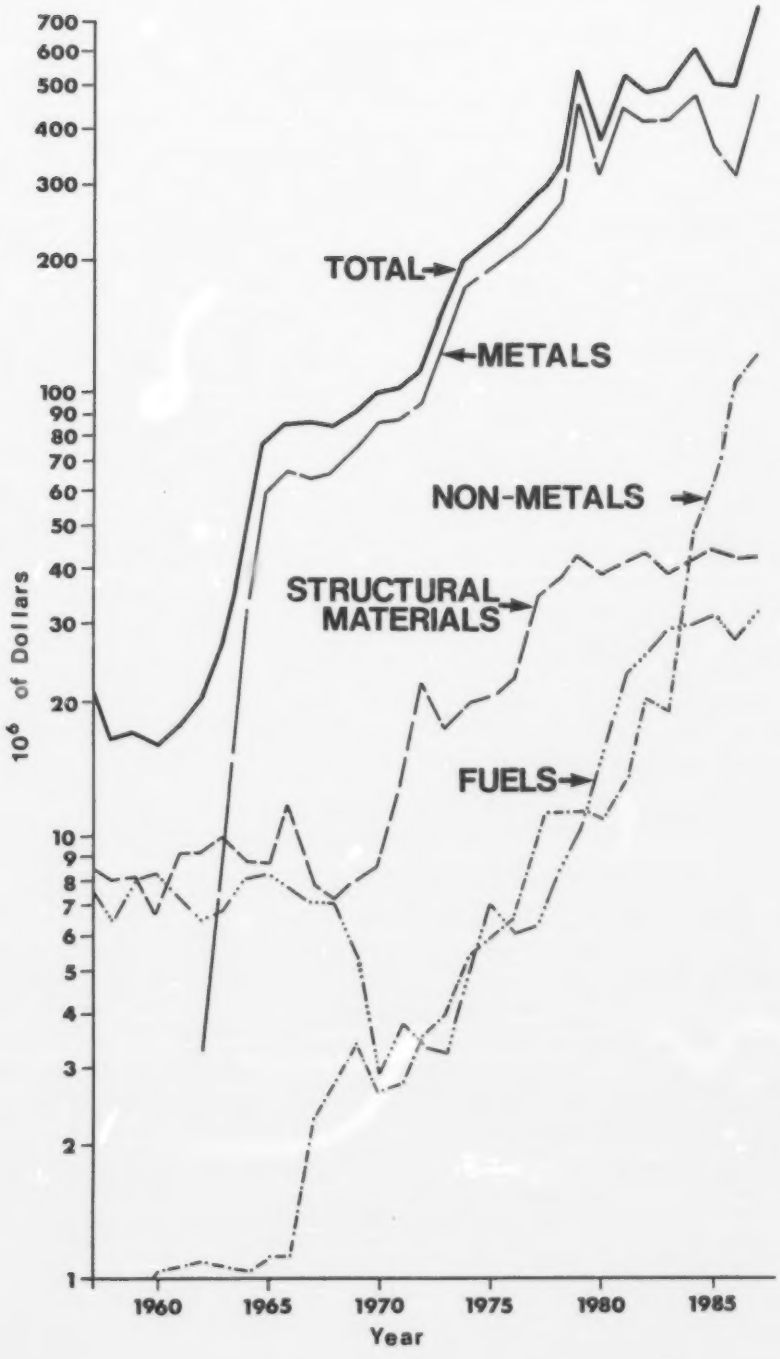

Figure 3. Value of mineral production in New Brunswick (1957-1987).

Table 1.
Mineral Production in New Brunswick
1987

Preliminary

METALS	Units	Quantity	Value ($)
Antimony	kg	---	10 797 000
Bismuth	kg	177 000	1 874 000
Cadmium	kg	61 000	346 000
Copper	kg	7 767 000	18 673 000
Gold	g	442 000	8 417 000
Lead	kg	79 433 000	83 960 000
Silver	kg	208 000	62 248 000
Zinc	kg	231 410 000	294 816 000
TOTAL			481 131 000
NONMETALLICS			
Peat	t	241 000	25 288 000
Potash	t	---	---
Silica	t	---	---
Salt	t	---	---
Sulphur (in smelter gas)	t	91 000	11 140 000
TOTAL			142 539 000
FUELS			
Coal	t	550 000	32 800 000
Natural Gas	m^3	1 000 000	14 000
Petroleum Crude	m^3	---	13 000
TOTAL			32 827 000
STRUCTURAL MATERIALS			
Clay products	t	---	2 850 000
Cement	t	---	9 285 000
Lime	t	---	---
Sand and Gravel	t	9 650 000	---
Stone	t	2 465 000	13 750 000
TOTAL			44 212 000
GRAND TOTAL 1987 (CDN $)			$700 709 000
GRAND TOTAL 1986 (CDN $)			$501 570 000

effective control of 39% of the issued common shares of Oakwood Petroleums Ltd. Subsequent to Landmark Corporation acquiring effective control of Durham Resources Inc., the Lake George antimony mine (Figure 1) was sold to Dominion Explorers Inc. (a Landmark-controlled subsidiary) at the Annual General Meeting of Landmark Corporation on June 25, 1987.

Antimony prices were relatively stable, but rose gradually near the end of the year. Production remained steady as did the workforce of 97. However, unforeseen problems with the hoist caused a temporary shutdown for a three-week period in October. Shaft deepening continued to the 1,275 foot (389 m) level. Ongoing exploration was directed toward expanding existing antimony reserves and exploring a gold-bearing zone in close proximity to the main ore body. Dominion Explorers Inc. remains North America's largest and Canada's only primary producer of antimony.

Gordex Minerals Limited poured its first gold brick at Cape Spencer (Figure 1) in June 1986. The company began mining about mid-year of 1987 and continued into November, with a workforce of 12 full-time and 23 contract employees. During the latter part of the year, the mine achieved full production.

A number of changes were made to improve gold recovery at the mine in 1987. Of the 68 000 tonnes of ore leached, 53 000 tonnes was leached in a new earthen vat that company officials felt would be much more efficient than the original heap leach process (Northern Miner, Feb. 1, 1988). The vat leach system cost $2 500 000 (Northern Miner, Nov. 2, 1987). The surface spray system by which cyanide is added to the ore was converted to a subsurface dribble pipe system that will enable leaching year round. Gold, which was removed from the "pregnant solution" using a zinc precipitate, is now removed using the more efficient carbon pulp process. Gold recovery rates are reported to be about 80% and production costs are about $230 (U.S.) per ounce of gold (Northern Miner, Dec. 21, 1987).

The company reported that geological reserves have increased to 1,000,000 tons (907 200 tonnes) of ore grading 0.057 oz./ton (1.95 g/t) gold (Gordex Minerals Limited, Annual Report, 1987). Exploration drilling is underway to expand existing reserves.

Fuels New Brunswick's only coal producer, N.B. Coal Limited, produced 550 000 tonnes of coal in 1987, an increase in production of 13%. The main user of this coal continued to be the New Brunswick Power Commission. Almost all the coal is supplied to generating facilities at Dalhousie and Grand Lake. N.B. Coal Limited, in conjunction with CIL Inc., carried out trials with a new blasting technique called "blast casting." The objective is to lower the working elevation of the dragline while mining of some of the deeper coal deposits.

Reclamation work (recontouring and seeding) continued at the nine open pits in the Minto-Chipman area (Figure 1).

The number of employees remained steady. Contract negotiations with the United Mine Workers of America continued through to year end.

At the Fire Road site, excessive amounts of acidic water generated from the cut continues to be addressed as an environmental concern. As a short term solution, lime is added to neutralize the acidic discharge. A permanent

solution is still being sought.

In the Stoney Creek field, Irving-Chevron completed a steam injection enhanced recovery program on their East Stoney Creek No. 1 well (Figure 1).

Industrial Minerals The Potash Company of America Inc. (PCA) mine, located 5 km east of Sussex (Figure 1), became eastern Canada's first potash mine in July 1983. The mine and mill facility is unique in North America because all mill tailings are returned underground as backfill.

Since Rio Algom Limited purchased PCA early in 1986, the company has committed more than $30 000 000 to improvements designed to bring rated capacity of the mine up to 635 000 tonnes/year KCl. PCA has been working toward improving mill equipment uptime and boosting potash recovery rates.

The highly automated mill produces granular and standard potash that grade a minimum of 60% K_2O.

PCA, a major New Brunswick salt producer, sells more than 500 000 tonnes of industrial salt each year.

Potash from the mine is loaded onto rail hopper cars and transported to the deep-water port-loading facility at Saint John, less than 70 km away. Major shipments were made to Western Europe, Latin America, and Asia.

Preliminary production figures for 1987 indicate a 30% increase over the figure for 1986. The PCA mine, mill, port and transportation infrastructure employs about 340 persons.

The Denison-Potacan Potash Company mine, located 25 km southwest of Sussex (Figure 1), commenced production in July 1985, becoming the second potash producer in the Province. The mine is a joint venture of Denison Mines Ltd. (60%) and the Potash Company of Canada (Potacan) (40%), a company equally owned by Enterprise Minière et Chimique of France and Kali und Salz AG of West Germany. Denison is the development manager; Potacan is the exclusive sales agent.

About 400 people are employed at the mine.

In 1987, the company continued its effort to bring the mill up to its design capacity of 780 000 t K_2O.

A 20 km railway spur line, built by CN Rail, links the mine to the main Moncton-Saint John line, allowing rail shipment directly from the mine site to the port at Saint John.

The storage facility at the port has a capacity of 115 000 tonnes. Rail off-loading and ship-loading facilities are shared with PCA. The port facility can accommodate ships of 35 000 t.

In 1987, production increased more than 40% over that of 1986. Shipments of potash were sent to the U.S.A., Latin America and the Far East.

Chaleur Silica Ltd. continued to produce silica from a siliceous sandstone deposit at Bass River, about 6.5 km east of Bathurst. The silica is used mainly as a fluxing agent in the lead smelter at Belledune. Sandblast sand and aggregate for low-alkali cement were also produced.

Between 1976 and the end of 1987, about 350 000 tonnes of silica have been produced. The current annual rate of production is about 50 000 tonnes.

Sussex Silica Inc. brought a silica deposit near Cassidy Lake, Kings County (Figure 1), into production during the fall of 1986.

Initial production from this mine consisted of lump silica (pebbles) and sand of various sizes. The lump silica is used in the manufacturing of silicon metal at Becancour, Quebec, and the coarse-grained sand is used in the manufacturing of silicon carbide. The finer sand is marketed as specialty products (sand-blasting material; filtration, tree nursery, and decorative sands) and for use in glass and fiberglass insulation.

Initial capacity of the Sussex Silica Ltd. operation is estimated at 80 000 tonnes/year. Recoverable reserves of silica are estimated to be a minimum 18 000 000 tonnes.

At its Brookville plant in east Saint John (Figure 1), **Brookville Manufacturing Company Ltd.** continued to produce the following products throughout 1987: agricultural dolomitic limestone, fertilizer filler, roofing granules, concrete and asphalt aggregate, driveway aggregate, road metal, and hardpack road subbase. Annual production over the past five years has been in the order of 200 000 tonnes.

Havelock Lime, a division of Dickenson Mines Limited, operates a quarry and crushing plant 40 km west of Moncton, at Havelock, Kings County (Figure 1). Through 1987, the company produced agricultural calcitic and magnesium limestone, industrial and chemical process stone, and crushed stone for various aggregate uses. The company is eastern Canada's only producer of calcined and hydrated lime.

Annual quarry output and crusher feed is approximately 300 000 tonnes of stone. Capacity for crushing is about 280 tonnes per hour, for pulverizing is about 45 tonnes/hour, and for calcining is 175 to 200 tonnes/day. Because limited reserves are accessible by surface quarrying at the company's Samphill quarry, an agreement was concluded with Canada Cement Lafarge Ltd. early in 1986. It will assure availability of large quantities of high-quality reserves in close proximity to the plant.

The company has recently embarked on an expansion program designed to increase its lime production capacity by installing a Fuller annular-shaft kiln, the first of its kind in North America. Except for lime, production capacity is considerably in excess of current or foreseeable demand. After the installation is completed in 1988, the new lime kiln will have a capacity of 300 tonnes of product per day.

Canada Cement Lafarge Ltd. has a quarry several kilometres east of Havelock in Westmorland County (Figure 1). Cement has been produced at this site since 1952, but the prominence of the plant as a Maritime producer has steadily diminished since 1982 due to higher production costs and a shrinking market for cement products.

The recent decline in oil exploration (one of the main markets for Havelock specialty products), protectionism against foreign imports by the U.S.A., and a significant slow down in major construction projects in the Maritimes have had a devastating effect on the plant's ability to maintain a profitable operation.

A similar plant operated by the company at Brookfield, Nova Scotia, appears to be a more modern and efficient operation.

The combined capacity at Havelock and Brookfield is about 800 000 tonnes. A current market estimate for Maritime cement products is less than 400 000 tonnes/year.

Specialty cement products have

traditionally been produced in the Havelock area because of the unique properties of the limestone.

Despite attempts over the past few years by Canada Cement Lafarge Ltd. to maintain its Havelock area plant as a grinding operation for imported Nova Scotia clinker, the current poor market conditions recently forced the company to reassess the viability of the operation. As a result, operations at the plant were suspended indefinitely in 1987. It is to be used only as a distribution point for the Nova Scotia products.

The company intends to continue the operation of two existing quarries as part of contract obligations with Dickenson Mines Ltd. (Havelock Lime), by which the company is to supply the Havelock lime plant with a maximum of 300 000 tonnes of raw stone each year. Canada Cement Lafarge Ltd. also intends to produce aggregate for its subsiduary, Permanent Concrete Ltd.

Elmtree Resources Ltd. continued the operation of a quarry and crushing-pulverizing plant about 20 km north of Bathurst at Elmtree, Gloucester County (Figure 1). The limestone produced (50 000 to 60 000 tonnes annually) is sold primarily to the lead smelter at Belledune as a fluxing agent. The remainder is sold as aggregate, fertilizer filler and agricultural limestone. The crushing and pulverizing capacity is sufficient to supply more than four times the current annual demand.

Reserves in the explored area of the operating quarry are sufficient for at least 10 years at the current rate of production. In addition, two deposits being developed have inferred reserves sufficient to ensure production for several decades.

Upper Kent Lime Works Ltd. maintained marl production from the bed of a small, partially drained lake (White Mud Lake) at Maplehurst near Upper Kent, Carleton County (Figure 1). Annually, the company sells 1000 to 1500 tonnes of marl to the region's farmers.

Peat shipments in 1987 totalled about 6 000 000 bale equivalents (207 000 tonnes), a volume comparable to the record shipment levels of 1986. Production in 1987 exceeded that of 1986 because of favourable weather conditions.

During peak production, a total of 850 people (including seasonal workers) were employed.

Sixteen companies were producing from twenty-one bogs and several bogs were being explored or being developed. A preliminary estimate of the value of 1987 production is $25 000 000.

SUMMARY

Mineral exploration in New Brunswick continued to focus on gold in 1987. Exploration expenditures of approximately $6 500 000 have been reported, though the actual amount spent in the Province may be twice that amount. Claim staking increased 62% over that of 1986, and the total number of claim equivalents in effect was up 7%.

Several new gold occurrences were discovered in a variety of geological terranes, although exploration was most intense in the Alcida-Upsalquitch River area of northern New Brunswick and along the Bay of Fundy coast near Saint John. The important gold-bearing terranes are associated with large regional thrust-wrench fault systems near the boundaries of major tectonostratigraphic zones.

Two mines were being developed in 1987: the Caribou zinc, lead,

silver, copper mine owned by East West Minerals Inc. and the Murray Brook gold, silver mine owned by Northumberland Mines Ltd.

The total value of minerals produced in the Province in 1987 was $700 709 000, up approximately 40% from 1986. The increase stems from higher metal prices and increased production. Of the total value, metallic minerals account for 69%, nonmetallic minerals 20%, structural materials 6%, and fuels 5%.

A SUMMARY TO ACCOMPANY
"PRELIMINARY REVIEW OF NEW BRUNSWICK'S MINERAL INDUSTRY, 1987"

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Zinc, in the form of sulphide concentrates produced by Brunswick Mining and Smelting Corporation Limited accounted for $294 816 000 (40%) of the total value of minerals produced. Lead and silver extracted at the company's Belledune smelter, accounted for $83 960 000 (12%) and $62 248 000 (8%), respectively. Copper ($18 673 000), bismuth ($1 874 000), gold ($8 417 000), antimony ($10 797 000), and cadmium ($346 000) also contributed to the total value of production.

Antimony, in the form of sulphide concentrate, was produced by the Lake George mine, now owned by Dominion Explorers Inc. The Gordex Minerals Limited gold mine at Cape Spencer achieved full production during the latter part of the year.

Fuels production in New Brunswick comprised 550 000 tonnes of Minto coal, and 1 000 000 m^3 of natural gas and 3112 barrels of oil from the Stoney Creek field. Coal production increased 13% over that of 1986.

The nonmetallic minerals, valued at $142 539 000, comprise potash, salt, peat, silica, and sulphur. Potash and salt are mined in the Sussex area by Rio Algom Limited and Denison-Potacan Potash Company. Peat is extracted from several bogs in northeastern New Brunswick. Silica is produced in

northern and southern New Brunswick. At the fertilizer plant adjoining the Belledune smelter, 91 000 tonnes of sulphuric acid, made from SO_2 gas, was used to make diammonium phosphate.

Structural materials, valued at $44 212 000, comprise clay products, cement, lime, sand and gravel, and stone. They are produced locally throughout the Province.

Brunswick Mining and Smelting Corporation Limited and Noranda Exploration Company Limited announced a $5 000 000 program to explore the Stratmat zinc-lead-copper-silver deposits, 6 km northwest of the Heath Steele mine. The Heath Steele mine will also be studied for an additional cost of $3 000 000.

East West Minerals Inc. purchased the Caribou zinc-lead-silver-copper mine and announced ambitious plans to bring the mine into production in 1988 at a cost of $40 000 000.

Northumberland Mines Ltd. obtained approval to proceed with a 1000 tonne/day vat leach operation to extract gold and silver from a gossan covering the Murray Brook sulphide deposit. The company has reported plans to begin operating in 1988. The capital cost is estimated at $5 400 000.

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